GEOGRAPHIC SCHOOL BULLETINS

THE NATIONAL GEOGRAPHIC SOCIETY, WASHINGTON 6, D.C.

VOLUME XXXVI, NUMBER 17, FEBRUARY 10, 1958 . . . *To Know This World, Its Life*

INTERNATIONAL COOPERATION ADMINISTRATION

FILIPINO CRAFTSMAN skins bamboo pole with bolo knife to make home flooring

- Dams for Luzon
- Life in a Philippine Barrio
- When Lincoln Went to War
- Everyday Wonders—Crayons
- Ethiopia

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22 million Filipinos—but will wet down sugar cane fields as well. Sugar from the central valley north of Manila ranks as top export crop. Crops and refineries suffered badly during World War II but have been restored.

On its southern slopes Luzon produces two other distinctive crops. The abacá vine, a cousin to the stocky banana plant, produces strong, supple fibers known as Manila hemp. And in coconut groves, men hack down coconuts, bake the meat in the sun, shred it into commercially valuable copra. Both of these raw materials formerly were shipped out of the country in their raw state. Now local businessmen are taking a hand, processing them for export. Abacá becomes finished rope. Copra turns into coconut oil for use in soap, oleo, and lard. The Filipino worker, below, supervises a rope-making machine in a cordage factory in Manila. His machine twists more than 100 strands of hemp twine together to make a three-and-one-half-inch hawser.

President Carlos P. Garcia, who began a four-year term as President of the Philippine Republic in December after colorful and fully democratic elections, seeks to promote more such industrialization. Between 700 and 800 new factories have mushroomed in the last five years, most on the key island of Luzon. They grind out cement, fertilizer, wire, paper, chemicals, soap—all things that formerly had to be imported. In the north, miners wrench chromite, gold, silver, copper, manganese, and iron ore out of the mountains. Lumbermen judge Philippine hardwoods among the finest in the world. Their export is booming.

To move raw materials to new factories and to bring agricultural produce to market, Luzon is improving its transportation system. A railroad chugs the twisting length of the island. Water traffic churns along rivers, bays, and serrated coast line. But the symbol of Luzon today is the motorbus—usually a somewhat worn, dusty, jouncing vehicle, most likely of U.S. manufacture. Here is the work horse of the byways. It bulges with passengers, laden with baskets of vegetables, chickens and pigs. It chugs through spreading cane fields and rice plots from one barrio (village) to another. Leaving the plain, the bus groans up into the hills along narrow, unnerving mountain roads. Frequent stops not only allow passengers to hop on or off, but permit the driver to deliver mail along the route. He is the postman, too. So the motorbus lurches along newly fashioned hard-packed dirt roads, passing the slower moving carabao and cart. And so moves Luzon.—A.P.M.

W. ROBERT MOORE, NATIONAL GEOGRAPHIC STAFF

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Thirsty Crops Get Needed Water as

Luzon Harnesses Its Rivers

ON THE Philippine island of Luzon, farmers labor under a typical tropical problem. Though yearly rainfall is plentiful throughout the young republic, often cascading down in bucketfuls, it comes irregularly. During the wet season, which runs roughly from May through October, rain drenches the land. Once in a while a typhoon even pounds across the island, bringing stinging rain and whistling winds. But for much of the rest of the year, the soil lies bone dry in the simmering heat.

Mountain folk in the rugged, remote areas of northern Luzon learned long ago to cope with this problem. Painstakingly, they built intricate terraces against the steep hillsides. Like giant staircases, these terraces step as much as 5,000 feet up a mountain's flank. Each terrace traps water to nourish its narrow rice paddy. In addition, many a rice farmer still builds an earthen reservoir at the top of a mountain, then distributes the water collected to the fields below through bamboo conduits or ditches. In this way, he gathers rain water during the wet season and uses it to nourish his crop during the hot growing season later.

Today, in the lowland rice bowl which stretches down the middle of Luzon, the same principle reappears on a much larger scale. As part of the industrialization program that is changing the face of the Philippines, an irrigation dam was recently opened on the Magat River. Water blocked by the gleaming white dam, above, drains into the tobacco fields and rice paddies of some 9,000 Filipino families. Ankle-deep in his precious water, the farmer trudges for hours behind his carabao (water buffalo), guiding his harrow.

Other Luzon dams, now planned or abuilding with financial help from the United Nations and the United States, will bring electricity to the provinces and the growing city of Manila, to the south.

Better irrigation will aid not only the rice crop—staple food for the more than

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for cooking. The miller keeps a fraction as commission. On Hipolito's one hectare (2.5 acres) he raises in a good year enough rice to feed his family. In the cool of each morning, he takes his faithful carabao to work his plot.

Now it is lunchtime. His wife, Elena, and one of five daughters have spread the table with Leonardo's papaya, the ever-present rice, and milk fish, a common variety bought at the local market. Meals usually include easily picked bananas and coconut. Occasionally, poultry and pork, corn or guava will spice up a meal. Everyone's favorite drink is *buko*, made by stirring chopped-up meat of a young coconut into coconut milk. You drink it right from the shell. At the next fiesta in honor of the barrio's patron saint, there will be *lechon*, roast young pig crackling on a spit over the open fire, dripping with a special barbecue sauce.

Lunch over, the girls roll mats on the floor and the entire family relaxes for a siesta. But all too soon there is work to be done. The whole family works, mother assigning jobs to the children. In the dry months, Hipolito does carpenter jobs for neighbors. To help make ends meet, Mrs. Agbanlog operates a *sari sari*, or variety store, beneath the house.

Finally, there is the "workshop" where Angelita now goes to join two other youngsters. Holding one end with their toes, they weave cordage from a plant fiber into popular *baracboc* slippers. Completed slippers, dyed in brilliant reds and purples, hang above. A pair like this sells at market for 30 to 45 centavos, or 15 to 23 U.S. cents.—A.P.M.

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AFTER WATCHING the bus unload its passengers and grumble off again down the dusty road, Leonardo Agbanlog, aged three, suddenly remembers the papaya he has tucked like a football under his arm. Come home with it right away, his mother said. So off he runs, dodging neatly around coconut palms, down the fence-lined road of his home town of Anonas, a typical barrio near the Lingayen Gulf in northwestern Luzon.

Turning in at Number 89 (citizens added the house numbers only in 1954), he bounds up the bamboo steps. Since he wears no shoes, he doesn't need to stop to remove them like other villagers. A gleaming split bamboo floor is the pride of each household.

INTERNATIONAL COOPERATION ADMINISTRATION PHOTOGRAPHS

Day in a Philippine Barrio

Leonardo's sisters keep theirs polished with coconut husk and cloth.

The Agbanlog home, like all others in Anonas, sits above the ground on eight-foot log stilts. Its wooden legs keep it dry during the rainy season. The house has the open look of the tropics, large windows inviting the breeze. The roof is of *nipa* palm thatch, although a few houses in the barrio have added a galvanized iron roof. The neat rattan siding stands as testimony to the Agbanlog's relative prosperity and to the father's skill at carpentry.

Hipolito Agbanlog, the father, puts a last scoopful of unhusked rice from the bin under the house into a burlap bag as he hears his youngest son enter. He will take the rice that afternoon to the local miller who will grind it into meal

could hold a rifle. The world held its breath.

That evening, President Lincoln, a tower of calm, summoned his carriage and went to his summer cottage at the Soldiers' Home, not far from Early's campfires. Aides wrung protesting hands. Early is near, they cried. Mr. Lincoln showed a slight irritation.

On July 11, General Early left the Southern lines and trotted up to scout Fort Stevens. Though it bristled with 19 guns and two mortars, it seemed feebly manned. Attack, Early ordered.

Just then a line of blue-coated troops deployed about the fort. Early hesitated, wondering if these were Grant's battle-seasoned soldiers.

For two breathless days, Confederate troops before Fort Stevens menaced the Capitol, seven miles away.

As it happened, the reinforcements were a few more units from the Washington camps. But the Union's "varsity team" was, in fact, debarking at Potomac wharves at that moment, robbing Early of his chance. Two leather-tough divisions of the blooded old 6th Corps, their uniforms faded almost to Confederate gray and smeared with the mud of Virginia trenches, swung through the capital's streets to the shouts of a grateful population. Their President followed them to the fort and stood, a six-foot-four target, on the parapet, listening to the crash of rifles, the strangely intimate buzz of bullets—like summer bees back home in Illinois.

Men long remembered Lincoln under fire. He stood impassively, in full view of Rebel sharpshooters hiding about where Walter Reed Hospital stands today. He watched a blue brigade spring from cover and drive in the Southern position, spilling 280 dead and wounded behind. But snipers still had the range. Five feet from the tall-hatted figure an army surgeon crumpled with a bullet in his ankle. Three feet away an officer slumped, dead. Lincoln, seeing at firsthand the war that he had asked so many young men to fight, seemed utterly unconscious of physical danger. Alarmed, General Horatio G. Wright, 6th Corps commander, implored the President to get down, finally threatened to remove him under guard. With a quizzical look at General Wright, Lincoln finally complied.

Early slipped away next morning and Lincoln went back to work. Nine months of war remained for him to bear . . . nine months of life.—S.H.

EDWARDS PARK, NATIONAL GEOGRAPHIC STAFF

TODAY'S FORT STEVENS overlooks streets and houses of a Washington residential area. Scott Hart, author of this story, stands where Mr. Lincoln stood, 94 years ago.

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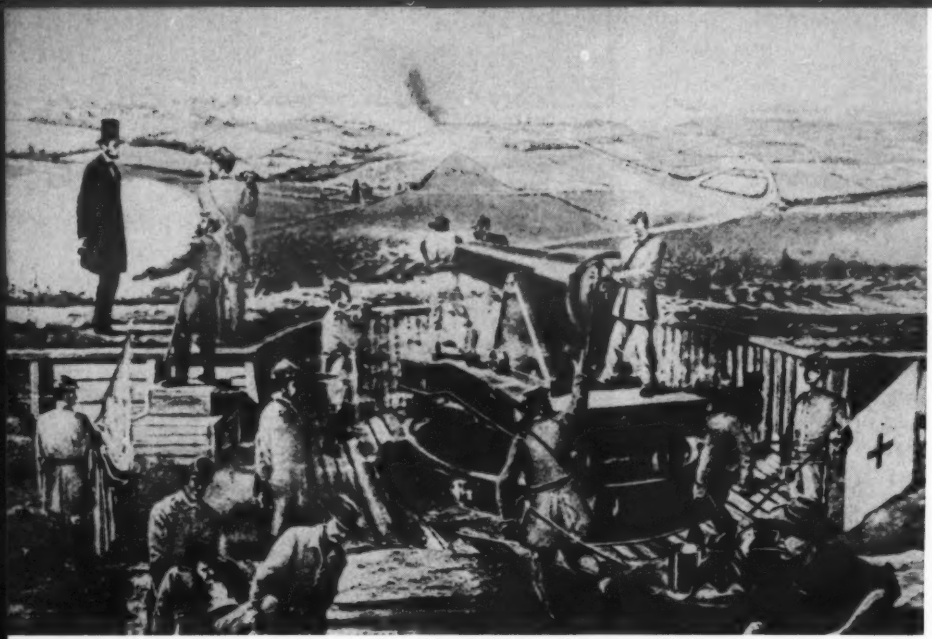

Mr. President Went to War

Howl, O gate; cry, O city . . . For there cometh a smoke out of the north, and none standeth aloof. . . .

The Prophet Isaiah's exhortation might well have been written for the city of Washington in July, 1864. The "smoke out of the north" was not the fury of an avenging Lord, but the lingering dust and smoldering fires left by some 20,000 lean, long-marching Confederate soldiers who had circled from Virginia to surprise the Union capital. None stood aloof as the gray horde swept within sight of the Capitol dome. Even Abraham Lincoln shunned precautions and mounted the parapet of Washington's Fort Stevens, above, to scan the Rebel lines. He remains the only President of the United States who, while in office, faced the savagery of battle, the hum and slap of bullets.

In June, 1864, Confederate General Robert E. Lee sent a portion of his army under Generals Jubal A. Early and John C. Breckenridge to threaten ill-guarded Washington. Lee hoped General Grant would weaken his Union forces, hammering toward Richmond, to defend his capital. Early, fiercely bearded, West Point-trained fighter, led his columns down the valley of Virginia—to Harpers Ferry by July 4th, to the old battlefield at Antietam, in Maryland, by July 6th, to the Monocacy by July 9th, where his veteran troops rolled over a small Federal force under General Lew Wallace.

Washington, some 30 miles south, was a "sitting duck." Though 68 forts and batteries rimmed the District of Columbia, man power had been siphoned off to nourish Grant's campaign. As Early drew near, frantic defenders made their preparations. An ambitious officer picked this inopportune time to request promotion. He was told, "We have five times as many generals as we want but we are greatly in need of privates. Anyone volunteering in that capacity will be thankfully received."

On July 10th, the Rebels reached Rockville, 10 miles north of Washington, then poured on into Silver Spring, just outside the District of Columbia. They seized papers in the house of Postmaster General Montgomery Blair, then set fire to it. Union bugles screamed up the home guard and government clerks—anyone who could hold a rifle. The world held its breath.

Pipes carry the wax to heated storage vats where it remains in liquid form.

In the factory, a tap opens and paraffin pours out into a mixing kettle. The mix man, above, is surrounded by barrels of powdered pigments of various colors. Each color must be measured out by weight to its own formula in order to blend properly with paraffin.

The mix man eyes his scales as he weighs out the formula for, say, red pigment. He dumps it into the mixing kettle, then lowers mixing blades to stir the "batter," just as a cook uses an electric mixer to make those muffins. Gradually, the pigment blends into the paraffin, turning it a smooth, even red.

Another "cook," the molder, now takes over the operation. He dumps the kettleful into a bucket and lugs it over to his molding machine—a table with hundreds of small holes sunk in its surface. Each hole is exactly the shape and size of the crayons that are to be produced. The holes shown at left are hexagonal, for making six-sided crayons that can't roll off school desks.

The molder dumps the hot wax onto the table so that it runs into the holes and forms a bright puddle of excess crayon mix over the top. This process is just like pouring batter into muffin tins. But the batter must be cooked to give the muffins their shape. These crayons are already cooked to the melting point of the paraffin. Now they are allowed to cool.

When the puddle becomes solid, it is shaved off, exposing the holes, each filled with its little column of wax and pigment, each now a hard red crayon.

Pushing down a lever, below, the molder raises the crayons from their holes. Each one is removed and inspected. Any that fail to pass inspection are tossed back into the mixing kettle.

The next step is labeling. A machine does this, too, slapping a different color

Crayons have developed through the ages from pieces of carbon and colored earths to manufactured implements for artists, engineers, architects, and children. Essentially the manufacturing process follows the old technique of candlemaking.

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Crayons

Another EVERYDAY WONDER Is Almost as Old as Art Itself

EDWARDS PARK, NATIONAL GEOGRAPHIC STAFF

THE little girl doesn't realize it, but she's following a human urge as old as mankind. Milleniums ago, cave dwellers drew pictures and colored them, leaving visual records that have provided many a clue to archeologists. The cave men used the rock walls of their dwellings to make their marks. If the small artist at the right used the walls of her home for that purpose she would probably get spanked. But the artistic instrument in both cases is the same—a crayon. Early man's was a crude chunk of carbon. The youngster's is a mass-produced cylinder of colored wax. The two are basically as alike as the instinct for self-expression that has affected human beings from the dawn of history.

Crayons are as much a part of a child's life as dolls, soldiers, glasses of milk, and school desks. Yet few have paused to consider how the colorful, inexpensive little devices are made—or how many of them are sold.

World's largest manufacturer of crayons is the Pennsylvania firm of Binney and Smith. Its daily output of crayons, stretched out in a single line, would form a brightly hued arrow from Philadelphia to New Haven, 150 miles away. A year's production would ring the earth about twice at the Equator. More than 300 different raw materials from all over the world go into a full-size box of crayons. Scientific tests keep each of the 64 colors exactly the right shade.

PHOTOGRAPHS FROM BINNEY & SMITH INC.

Crayon making is a little like cooking—but on a huge scale. Ingredients are measured, mixed, and molded to shape just as they are to produce a tray of blueberry muffins. The crayon recipe calls for paraffin and a vast variety of color pigments.

Paraffin usually arrives at the factory as a liquid in railroad tank cars. If the train happens to pull in on a cold day, the cars get sprayed with hot steam to keep the paraffin from congealing.

ETHIOPIA—WEALTH IS WAITING

ON MANY of Ethiopia's broad, high fields, farmers still scratch their soil with ox-drawn wooden plows. Yet uranium, touchstone to the future, awaits development in this African nation. So do gold, copper, tin, coal, and hydroelectricity. Almost unlimited industrial power could transform Ethiopia. Someday it probably will. Awaiting the day are some 20,000,000 fiercely independent Ethiopians.

When Americans think of Ethiopia they usually picture its often-photographed ruler, His Imperial Majesty Haile Selassie I, who claims descent from Solomon and the Queen of Sheba. His domain is worth a close look. Superimposed on a United States map, this rumpled plateau would extend from Maine to South Carolina, from New York City to Iowa. Coffee thrives—the nation's chief export. Peaks soar to 15,000 feet, overlooking gorges noisy with torrential rivers. Through one ravine the Blue Nile plunges from Lake Tana, on its way to nourish cotton fields of Sudan and Egypt. Another gash is Africa's Great Rift.

Eritrea, handed to Ethiopia in 1952, gave the nation a Red Sea coast. French and British Somaliland, Somalia, Kenya, and Sudan nudge its other borders. Yet so isolated are its mountain valleys that they ring with more than 30 different languages. Religions vary from fourth century Christianity to snake-worship.

In the mountain-rimmed capital, Addis Ababa, conversations crackle in Galla and Amharic. Limousines thread through herded sheep.

Ethiopia's well-traveled Emperor promotes airlines, roads, and resources. He welcomes foreign technicians. Soon the chatter of women carrying gumbos of water (right) may give way to the roar of tractors and trucks.—Θ

PHOTOGRAPHS FROM TONI SCHNEIDERS

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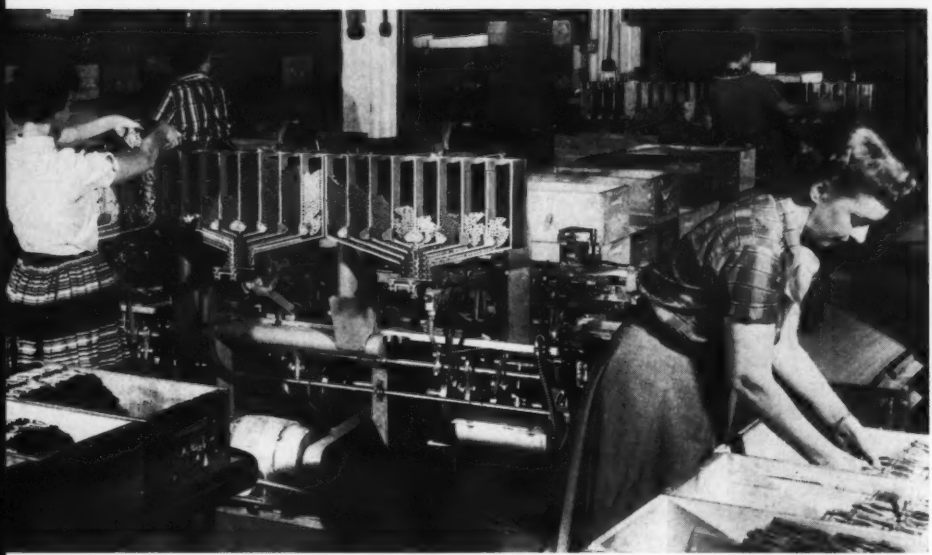
label around each color batch of crayons. The red crayons that have just been made get red labels, then meet up with other colors and are fed into a packaging machine, below. Mechanically, the right assortment drops into boxes. Some boxes hold only six crayons. Others hold eight, 12, 16, 24, or 48 crayons. The biggest packs in 64—all of different colors.

Crayons come in many sizes and shapes to serve a variety of purposes. Thick, jumbo crayons are made to fit the purposeful grip of a kindergartner. Slimmer ones will expend their hues on second- and third-grade poster projects. Lumbermen use a special crayon to mark boards. Others are designed for metals, textiles, glass, and rubber. Surveyors use a kind of crayon to scrawl their marks on highways.

Since the days of Michelangelo and Leonardo da Vinci, pastel crayons have served artists. They give the delicate shadings of nature to landscape pictures. Their pale, pleasing hues have become so distinctive that the word pastel may now refer to certain colors as well as to the crayons that originally produced them.



BINNEY & SMITH INC.

EACH COLOR has its separate bin, constantly hand-filled by girls. In single file, crayons roll down their individual ramps to come together in familiar cardboard boxes.

Pastels are usually made by mixing pigment with a paste made from fine chalk and gum water.

Similar to the pastel is the pressed crayon, a mixture of earth or clay and pigment, held together by an adhesive. These are generally harder and heavier than wax crayons. They are used for drawing, designing, and map-coloring, will withstand a hot climate, and will erase without trouble. Pressed crayons are made by forcing the mixture through a tube, like tooth paste, and cutting off desired lengths.

Children in the golden age of Greece and during the Roman Empire used crayons to capture the wonder of the world around them. They still do in the Atomic Age. It's a safe bet they still will a thousand years from now. With small, bright-colored devices that they take entirely for granted, they'll be scrawling their impressions of Daddy and Mommy, of animals, trees, and birds.—

Emperor Haile Selassie and Advisers Plot Improved Future for Ethiopia

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